



FY 2020 EPA Program Evaluations

Office of Enforcement and Compliance Assurance (OECA)

Activity 1:

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| Title | RCRA Data Analytics Evaluation |
| Lead National Program/Region | Office of Enforcement and Compliance Assurance |
| Strategic Goal and Objective Supported | Strategic Goal 3: Greater Certainty, Compliance, and Effectiveness Strategic Objective 3.1: Compliance with the Law |
| Completion Date | FY 2020 |

Purpose and brief description: Since 2015, EPA has worked with The University of Chicago Energy & Environment Lab (UChicago E&E Lab) to develop a robust machine learning model that forecasts the likelihood that large quantity generator (LQG) hazardous waste facilities will violate RCRA regulations. The model is based on 15 years of historical data generated from across EPA programs. When used in combination with inspectors’ experience, skills, and knowledge, the predictive model can help regulators drastically increase the likelihood of finding violations – allowing better focus for scarce inspection resources. Throughout FY 2017 – FY 2019, EPA coordinated across Regions to field test the efficacy of targeting inspection resources using machine learning methodologies. The randomized evaluation completed in FY 2020 benchmarked the ability of the model to identify facilities with severe RCRA violations detected during inspection relative to status quo practices across Regions. Preliminary results demonstrate that the model yields a substantial increase in efficiency of detecting hazardous waste violations compared to current targeting practices, with no increase in operational cost. This is the first rigorous, experimental field test that has been conducted by EPA’s enforcement and compliance program for a predictive targeting model.

Brief List of Results/ Conclusions/Findings: The University of Chicago will release a working paper outlining how the model nearly doubled the violation detection rate and pursue publication in a top economic academic journal.

How EPA Used the Results/Conclusions/Findings to make program improvements, support planning and policy decision making, assess progress toward mission/objectives, and/or make changes to strategies or measures: Based on this result, EPA released a new set of predictive analytics scores to both Regions and states for their use in FY 2021 inspection plan targeting. Furthermore, EPA will maintain and continue to refine the model with ongoing support from the UChicago E&E Lab with scores for FY 2021 and subsequent years being released on the [Enforcement and Compliance History Online \(ECHO\)](#) platform to support regional and state targeting efforts on an ongoing basis.

Link for findings: Not yet available

Office of Land and Emergency Management (OLEM)

Activity 1:

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| Title | Underground Storage Tank Inspection Frequency Study |
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| Lead National Program/Region | Office of Land and Emergency Management (OLEM), Office of Communications, Partnerships, and Analysis (OCPA) |
| Strategic Goal and Objective Supported | Strategic Goal 1: A Cleaner, Healthier Environment Strategic Objective 1.3: Revitalize Land and Prevent Contamination |
| Completion Date | August 2020 |

Purpose and brief description: The Energy Policy Act (EPAAct) of 2005 enacted a requirement that all regulated underground storage tanks (UST) containing petroleum or certain other hazardous substances must be inspected for compliance with UST release prevention and detection requirements at least once every three years. This study examines the impact of EPAAct’s inspection frequency requirement on UST facilities’ compliance with release detection and prevention requirements in Louisiana and Arkansas.

Brief List of Results/ Conclusions/Findings: Results suggest that increasing inspection frequency improved UST facilities’ compliance in both Louisiana and Arkansas. EPA also finds that the impact of inspection frequency on compliance is heterogeneous based on a facility’s compliance status at the last inspection—larger impact for those facilities that were compliant than those that were noncompliant at their last inspection.

How EPA Used the Results/Conclusions/Findings to make program improvements, support planning and policy decision making, assess progress toward mission/objectives, and/or make changes to strategies or measures: EPA’s mission is to protect human health and the environment, both of which are threatened by UST releases. The greatest potential hazard from a leaking UST is that petroleum or other hazardous substances can seep into the soil and contaminate groundwater, the source of drinking water for nearly half of all Americans. A release from an UST can also present other health and environmental risks, including potential for fire and explosion. This study assesses the effectiveness of EPAAct’s inspection frequency requirement towards mitigating releases and resulting deterioration of human health and the environment. The study reaffirms EPA’s commitment to on-site inspections and EPA continues to work with states to ensure at least a 3-year inspection frequency. EPA is committed to continued training for UST inspectors through our grants with ASTSWMO and NEIWPC.

Link for findings: <https://www.epa.gov/aboutepa/energy-policy-act-2005-increased-inspection-frequency-and-compliance-underground-storage>.

Activity 2:

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| Title | Estimating the Effects of Superfund Cleanups on Children’s Blood Lead Levels |
| Lead National Program/Region | Office of Policy (OP), National Center for Environmental Economics (NCEE) and Office of Land and Emergency Management (OLEM), Office of Communications, Partnerships, and Analysis (OCPA) |
| Strategic Goal and Objective Supported | Strategic Goal 1: A Cleaner, Healthier Environment Strategic Objective 1.3: Revitalize Land and Prevent Contamination |
| Completion Date | March 2020 |

Purpose and brief description: This study identified the effect of Superfund cleanups on children’s elevated blood lead levels across a wide swath of Superfund sites spanning different regions, contamination levels, and potential exposure pathways. It quantified the average health impacts across a substantial subset of the Superfund program.



Brief List of Results/ Conclusions/Findings: The analysis of two decades of blood lead level measurements from children across six states indicates that cleanup at lead contaminated Superfund sites lowered the risk of elevated blood levels for children living within two kilometers of the sites by 13 percent to 18 percent.

How EPA Used the Results/Conclusions/Findings to make program improvements, support planning and policy decision making, assess progress toward mission/objectives, and/or make changes to strategies or measures: Information from this study supports EPA’s contribution to the Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts and improved the Agency’s understanding of the potential scope of the childhood lead exposures and the effect of Superfund cleanups on elevated blood lead levels.

Link for findings: <https://www.sciencedirect.com/science/article/abs/pii/S0095069619303304>.

Office of Research and Development (ORD)

Activity 1:

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| Title or Topic of Study/Tool/Project | Evaluating health impacts of lead remediation at Omaha lead superfund site |
| Lead National Program/Region | Office of Research and Development (ORD) and Region 7 |
| Strategic Goal and Objective Supported | Strategic Goal 3: Greater Certainty, Compliance, and Effectiveness Strategic Objective 3.3: Prioritize Robust Science |
| Completion Date | FY 2020 |

Purpose and brief description: The Omaha Lead Superfund Site (OLSS) encompasses 27 square miles within the eastern portion of greater metropolitan Omaha in Douglas County, Nebraska. The site was contaminated by emissions from a lead smelter and refining facility (ASARCO) that operated for approximately 125 years until its closure in 1997. Beginning in 1999 EPA sampled soils at residential properties and childcare facilities in Omaha to define a “focus area” for clean-up operations; the focus area was intended to delineate the area where soil concentrations for at least 1 in 20 homes exceeded 400 parts per million (ppm). EPA worked with Douglas County Health Department to link blood lead surveillance data with EPA data on soil lead concentrations and remediation dates.

Brief list of results/conclusions/findings: Analyses suggested an important role for both a residence’s yard and its neighborhood soil lead concentrations in predicting Elevated BLL (>5 µg/dL), with neighborhood soil lead concentration becoming more influential following remediation. Risk of Elevated BLL (>5 or 10 µg/dL) was higher before remediation in models that examined this relationship across and within children. BLL improvement was associated with soil-based intervention in some fully adjusted difference-in-differences models.

How EPA used the results/conclusions/findings: These analyses showed that EPA’s soil removal and replacement actions at the OLSS were effective in reducing Elevated BLLs. This paper improved the Agency’s understanding of the importance of reducing residential and neighborhood soil concentrations to achieve associated decreases in BLL.

Link for findings:

<https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0703481>